

FIG. 1

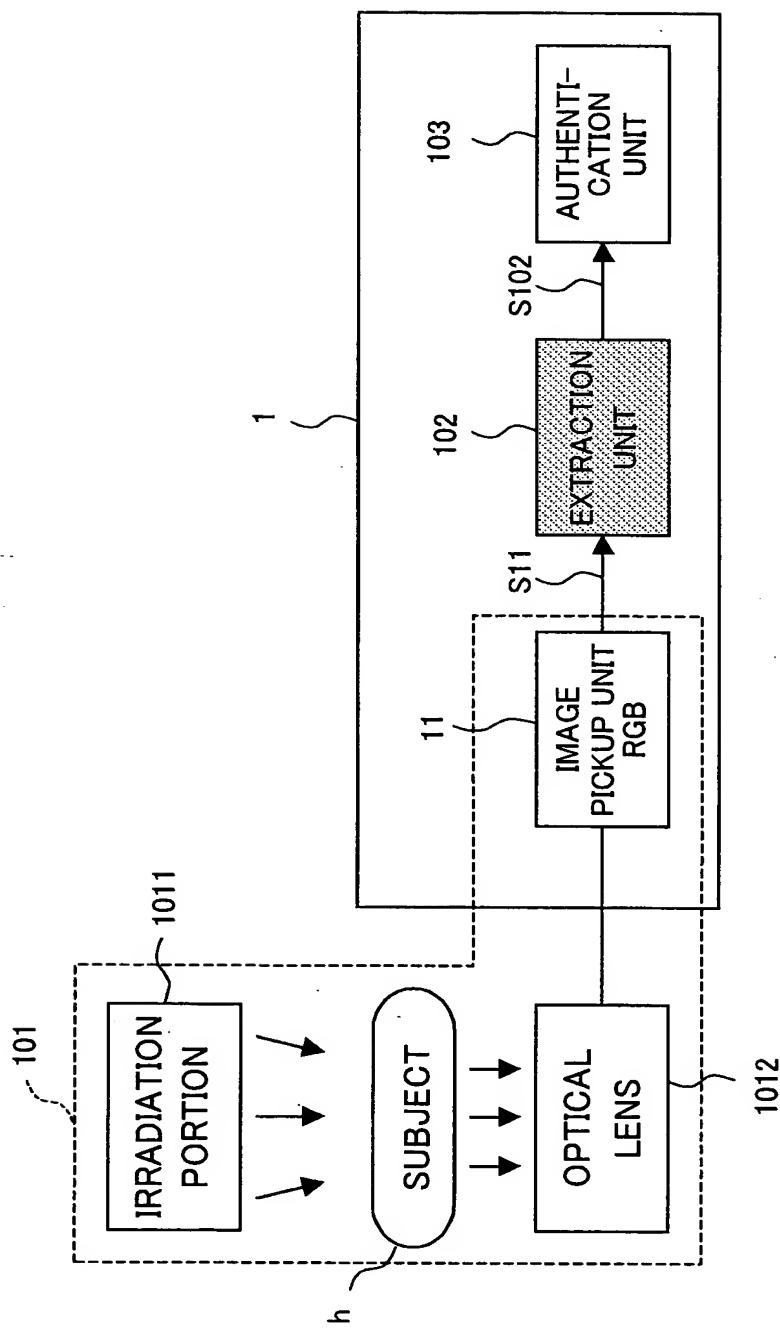


FIG. 2

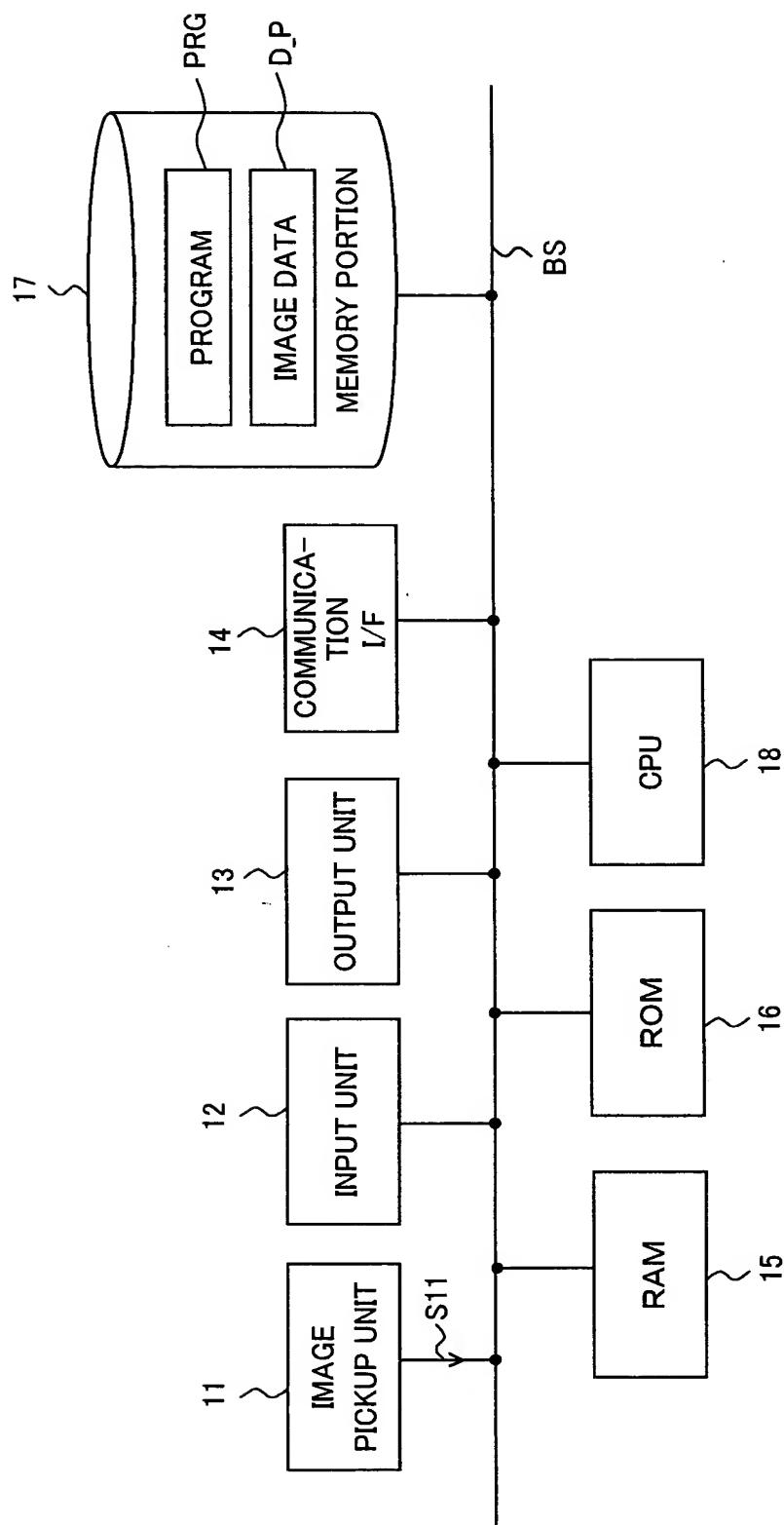


FIG. 3

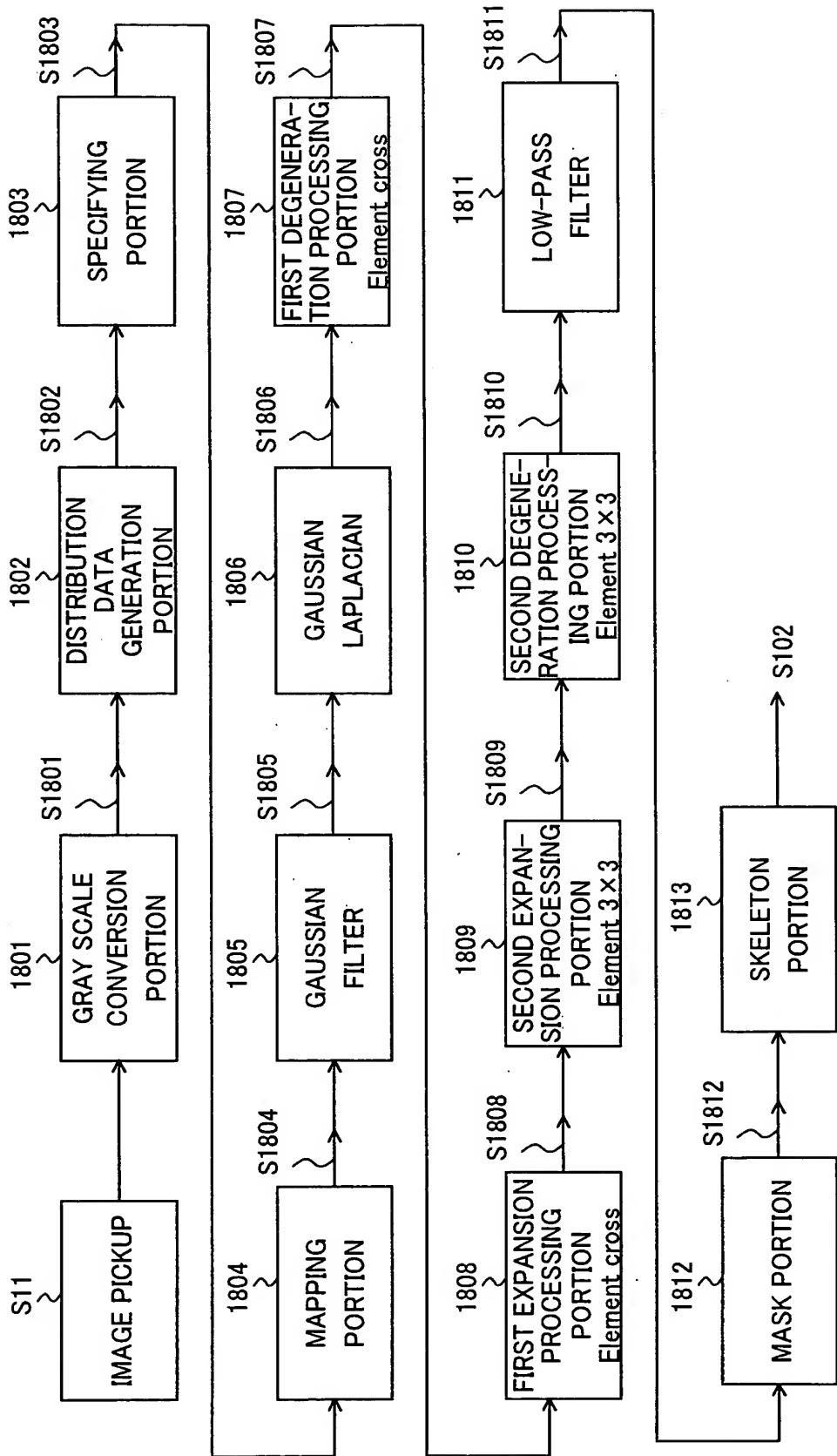


FIG. 4A

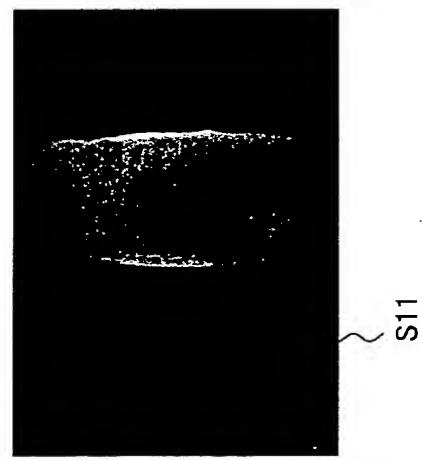


FIG. 4B

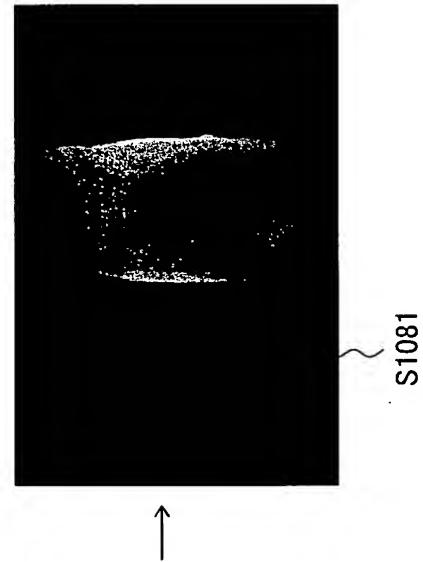


FIG. 4C

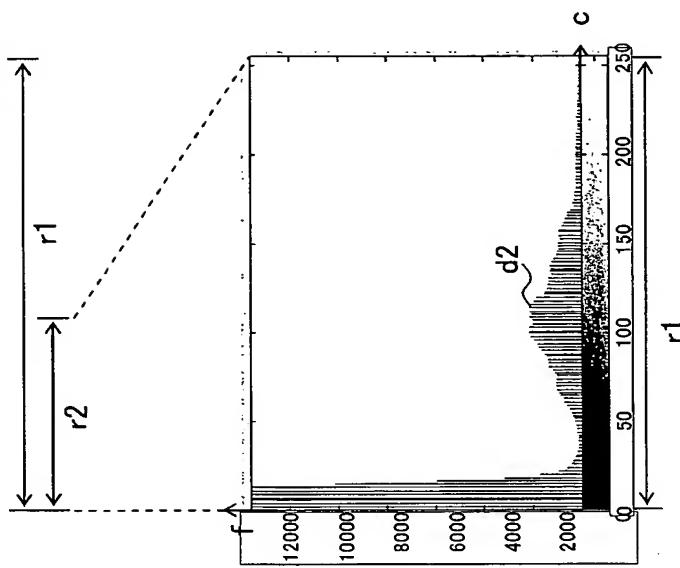
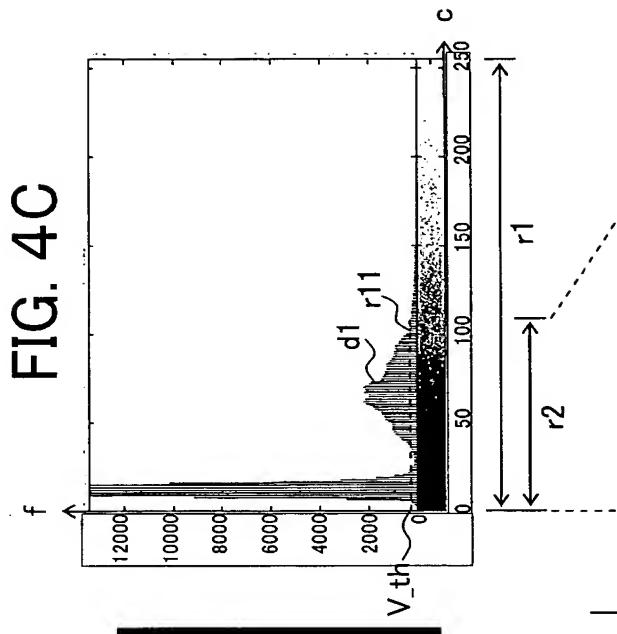


FIG. 4E

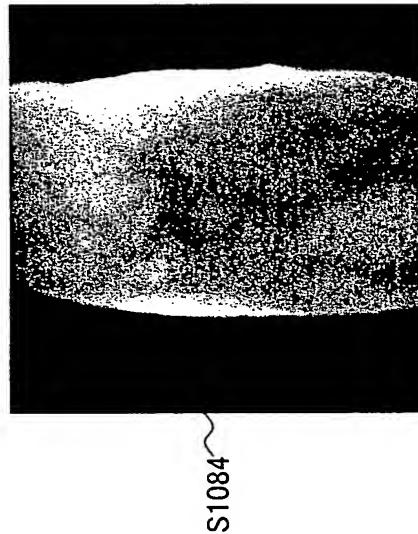


FIG. 4D

FIG. 5A

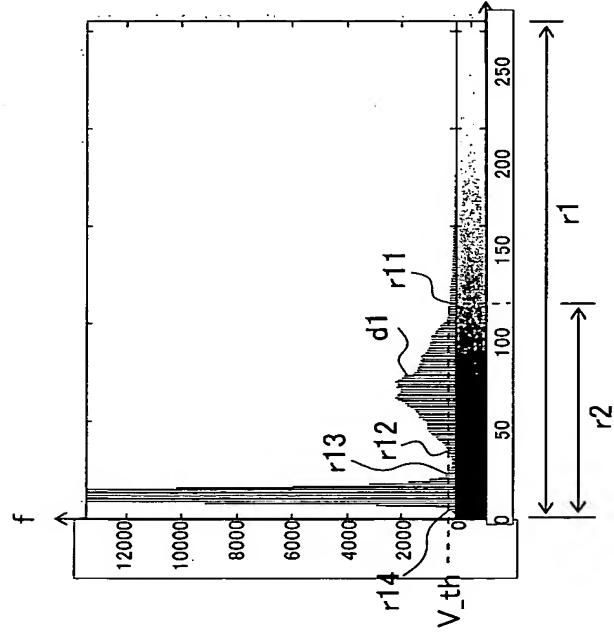


FIG. 5B

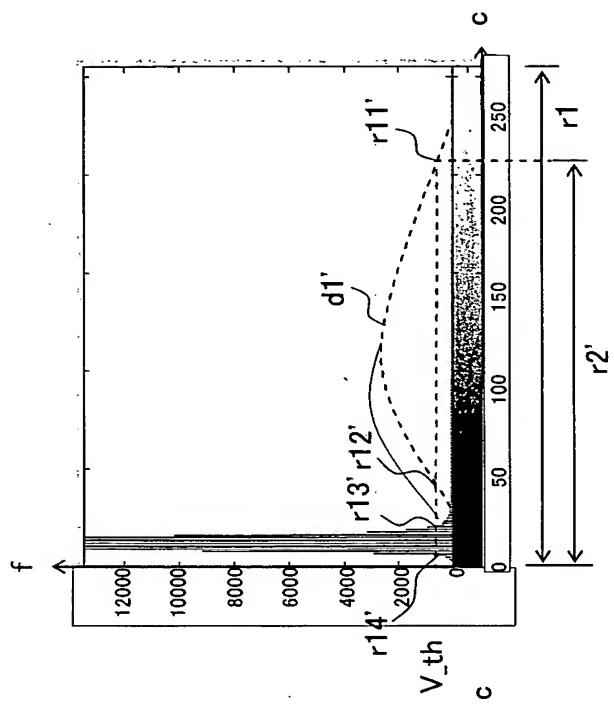


FIG. 6

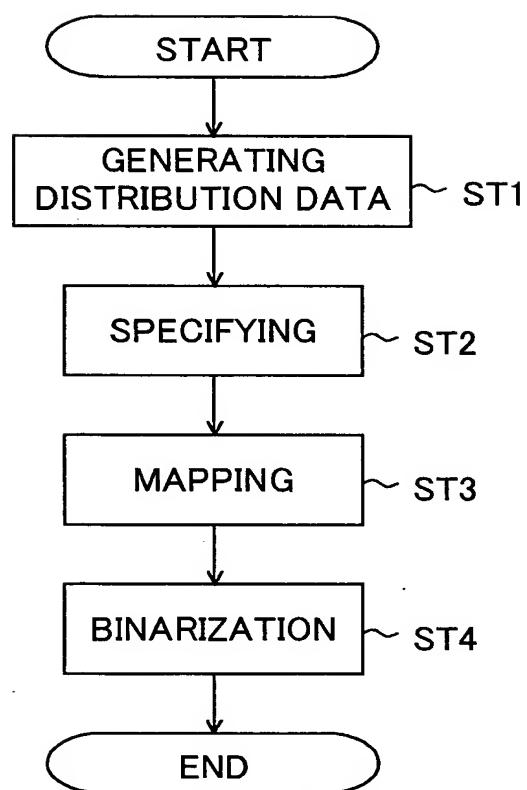


FIG. 7

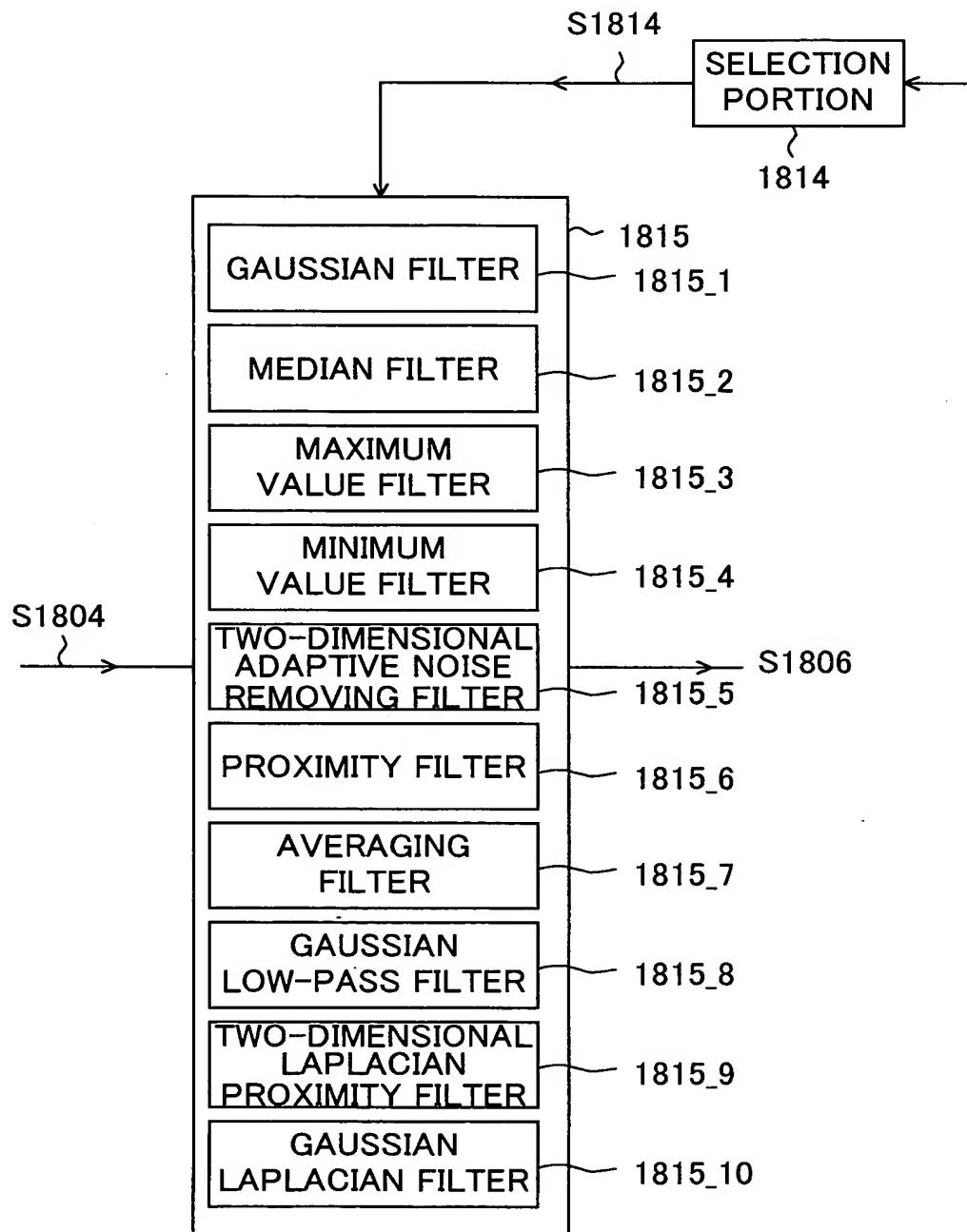


FIG. 8

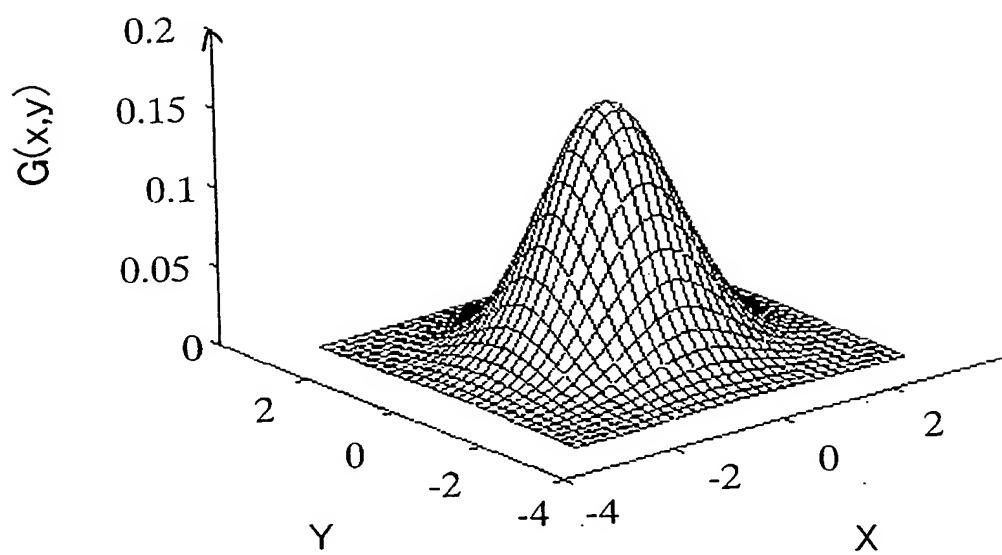


FIG. 9D

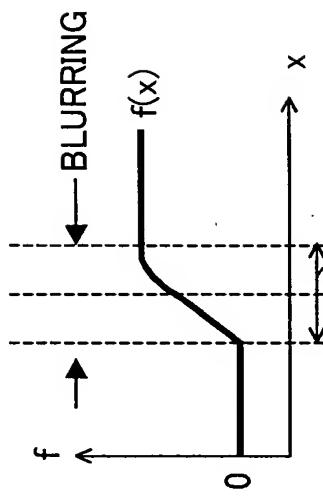


FIG. 9E

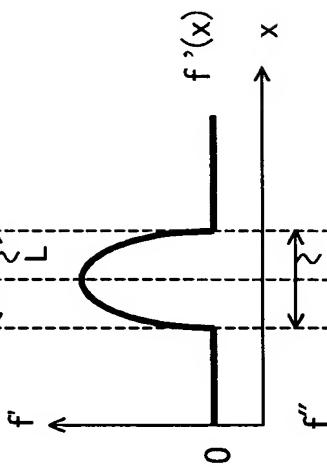
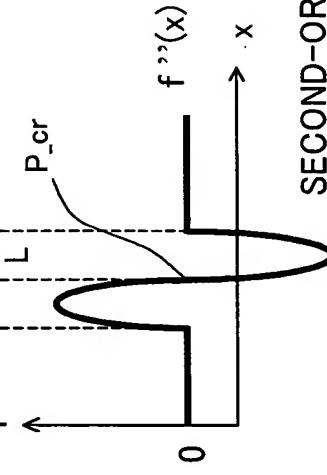


FIG. 9F



SECOND-ORDER DIFFERENTIAL

FIG. 9A

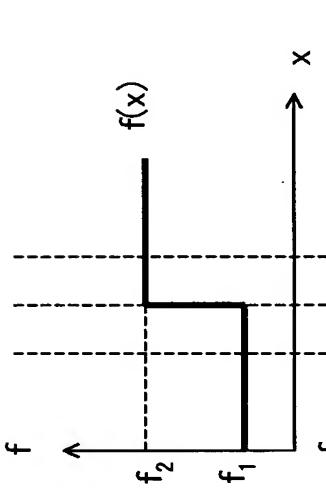


FIG. 9B

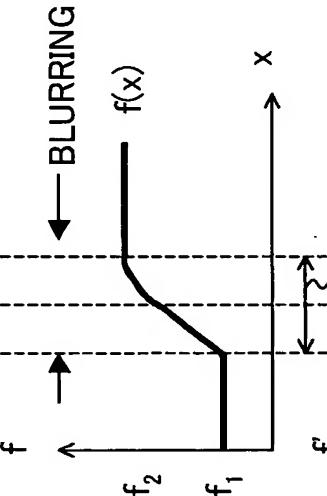
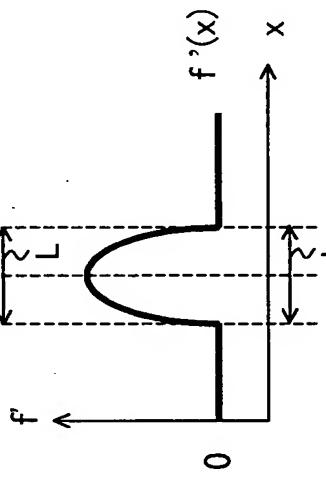


FIG. 9C



FIRST-ORDER DIFFERENTIAL

FIG. 10A

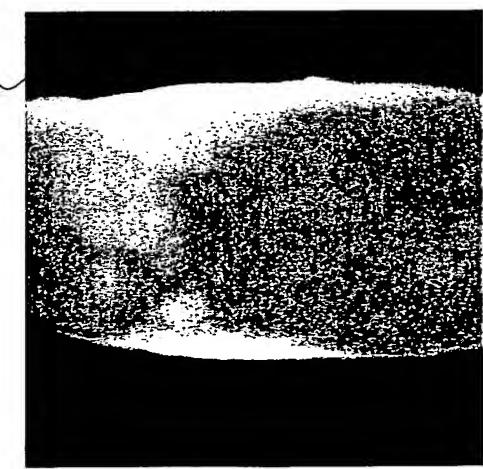


FIG. 10B

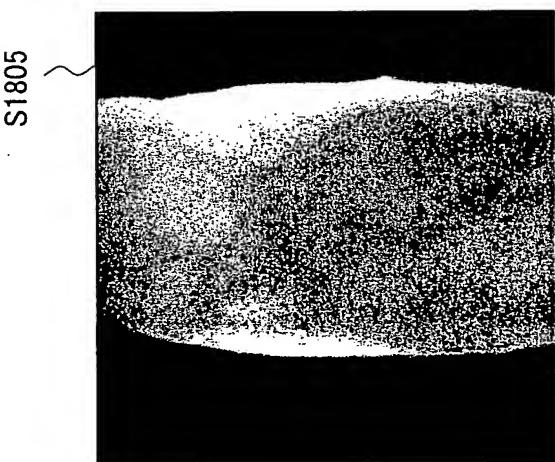


FIG. 10C

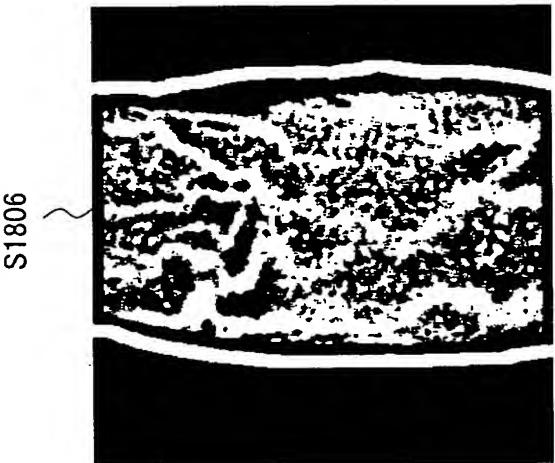


FIG. 11

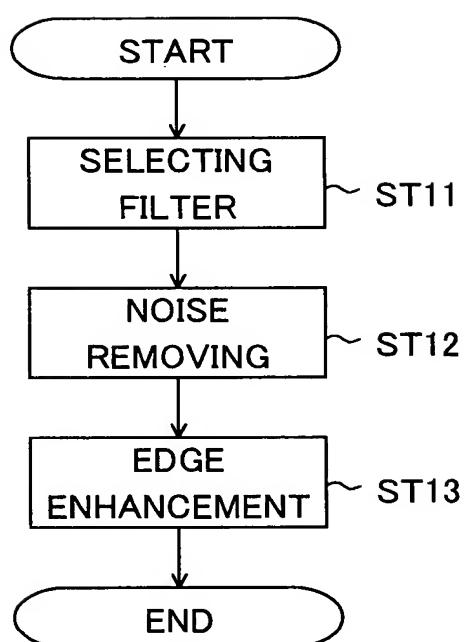


FIG. 12A

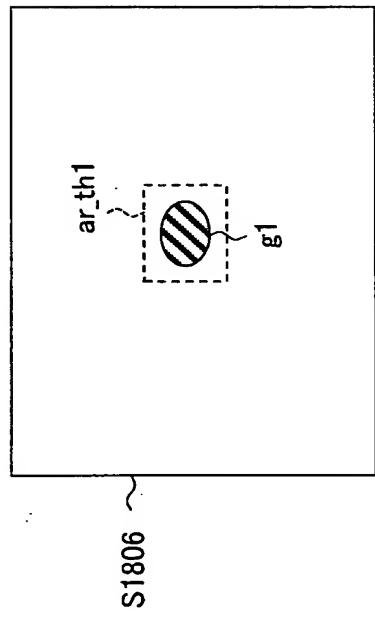


FIG. 12B

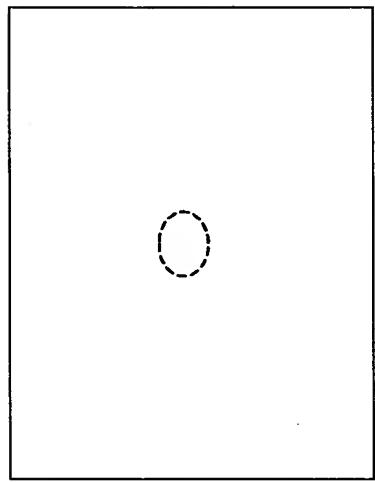


FIG. 12C

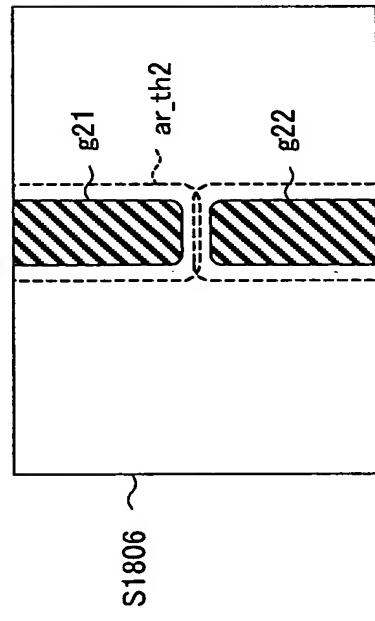
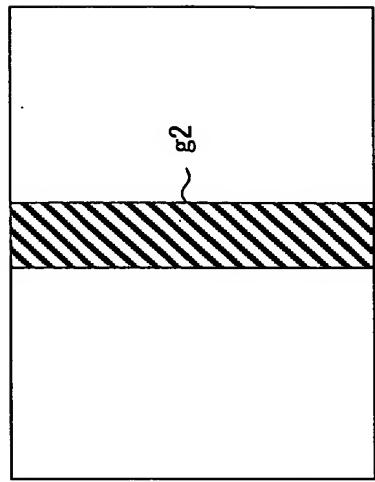


FIG. 12D



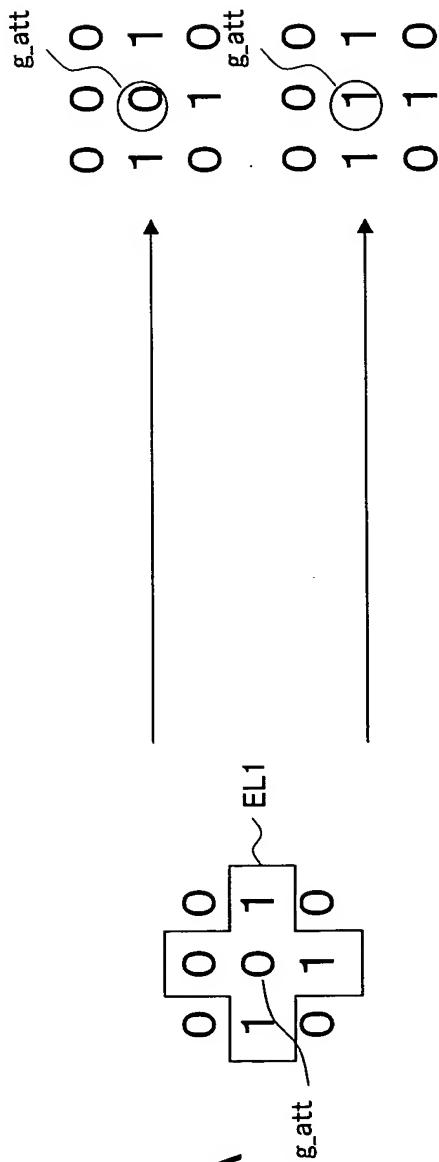


FIG. 13B

FIG. 13C

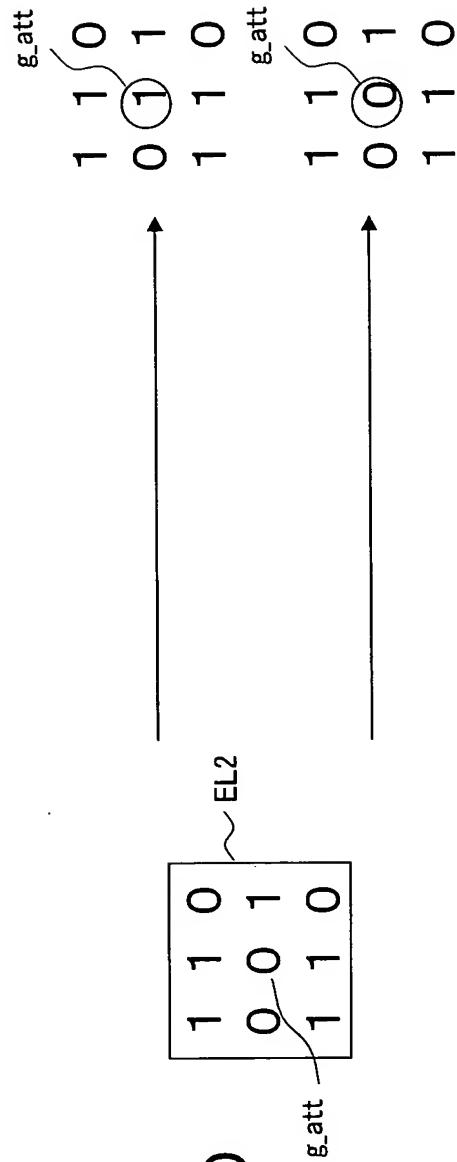


FIG. 13E

FIG. 13F

FIG. 13D

FIG. 14A

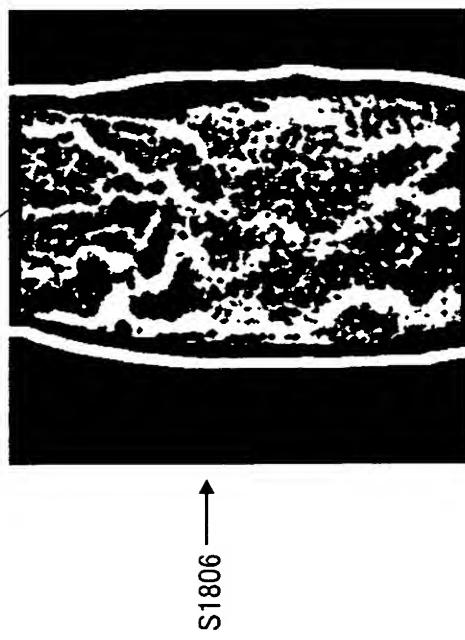


FIG. 14B

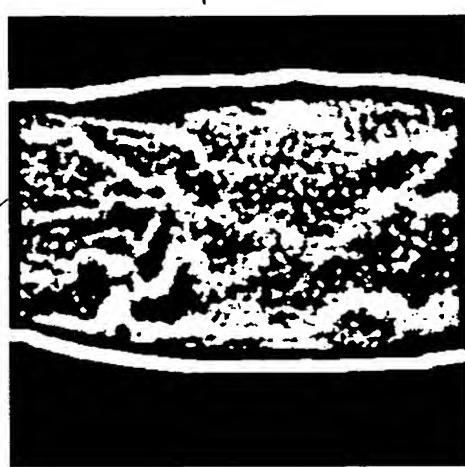


FIG. 14C

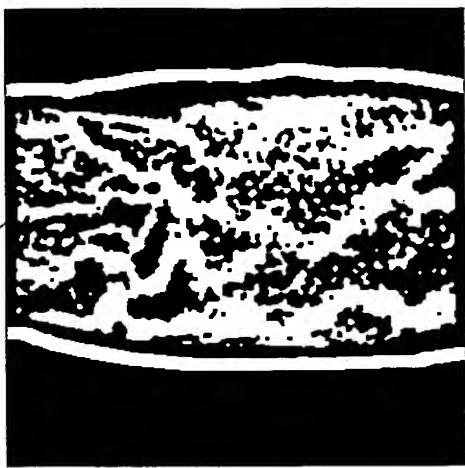


FIG. 15

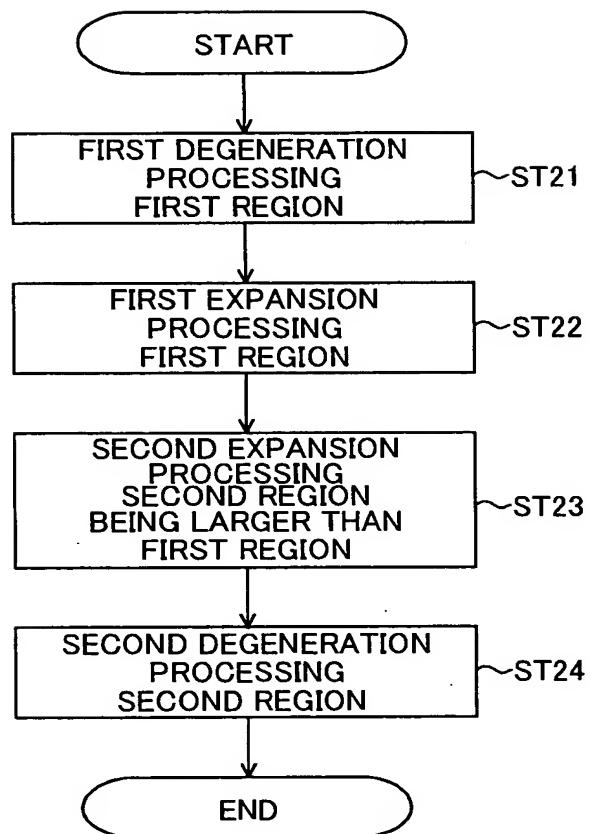


FIG. 16A

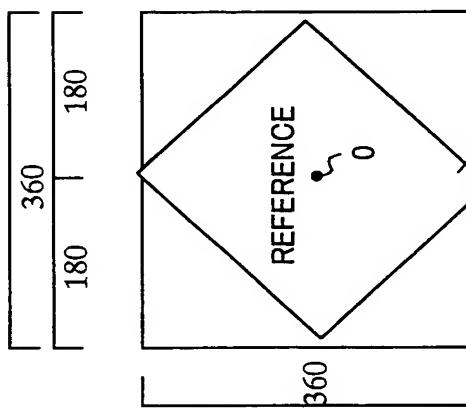


FIG. 16C

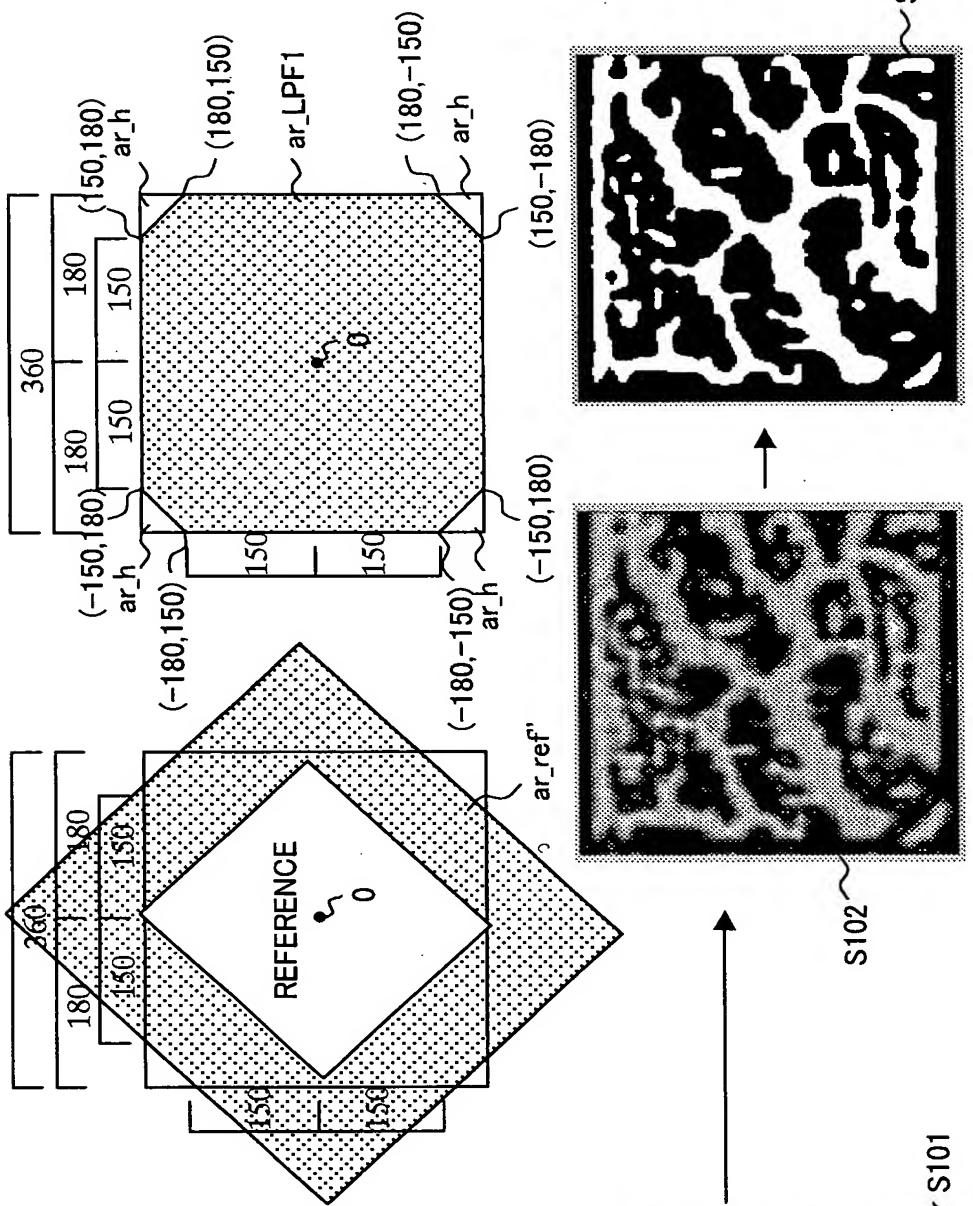


FIG. 16D

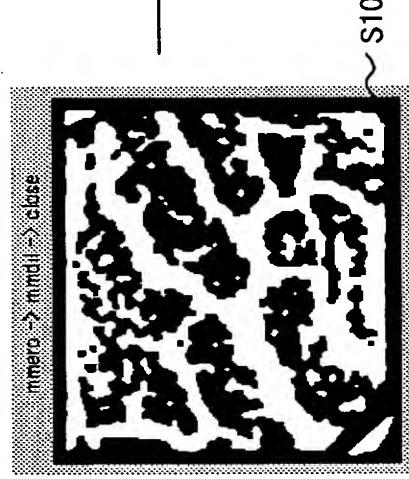


FIG. 16E

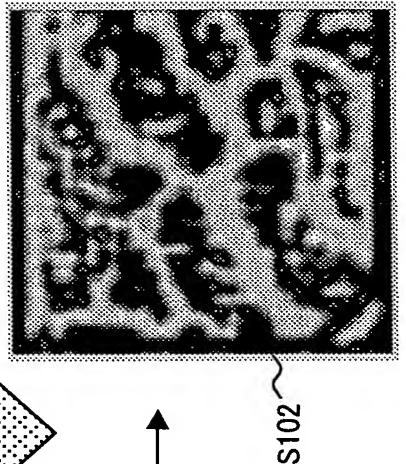


FIG. 16F

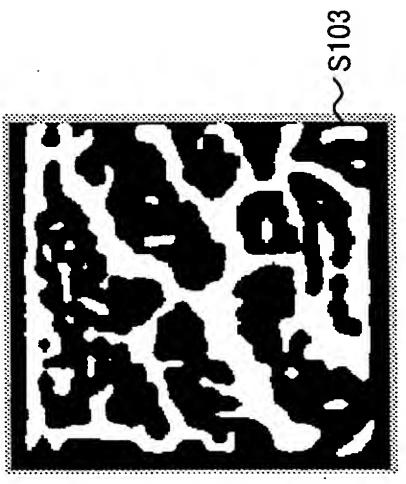


FIG. 17A

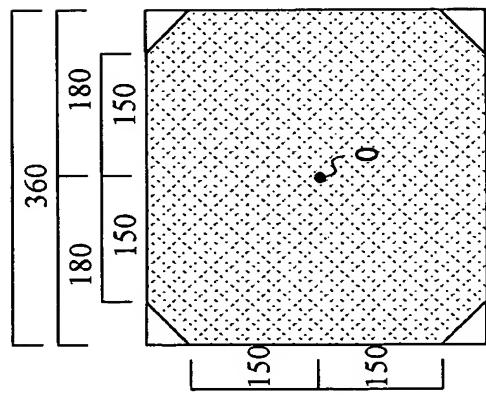


FIG. 17B

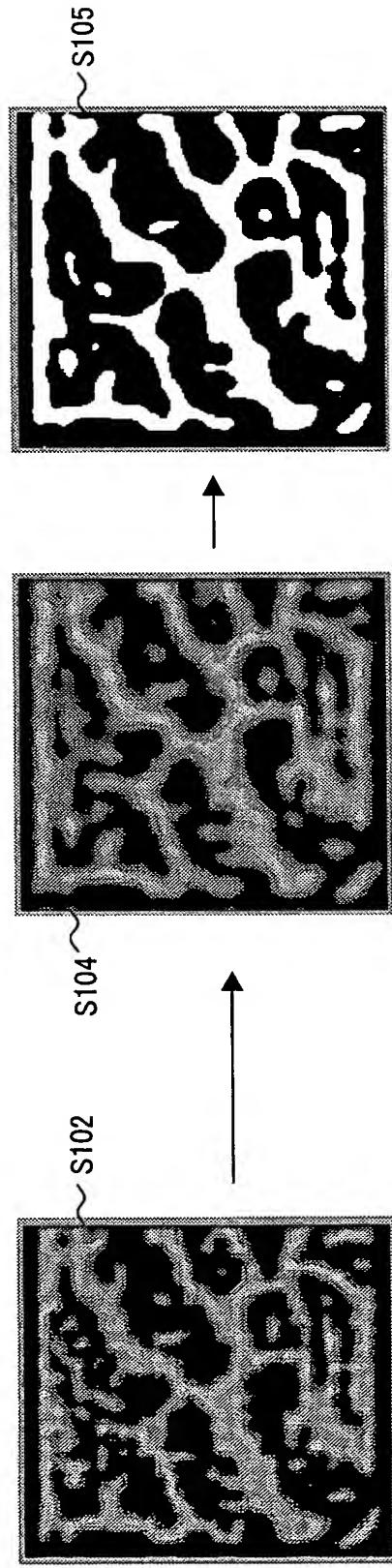
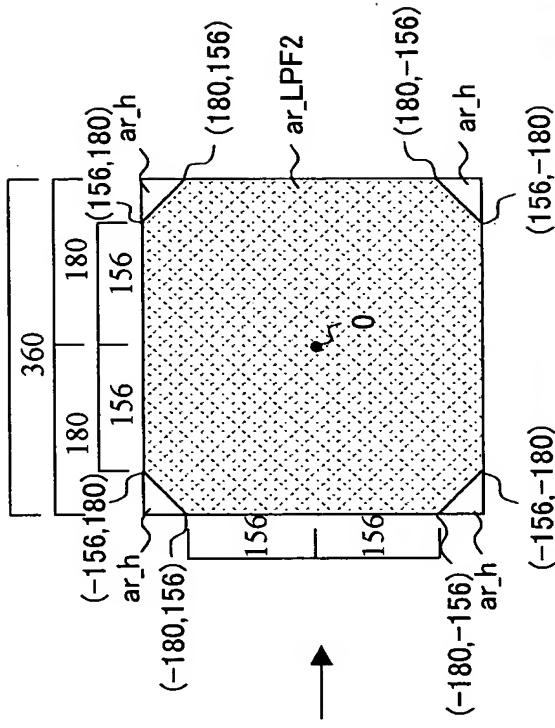


FIG. 17C

FIG. 17D

FIG. 17E

FIG. 18A

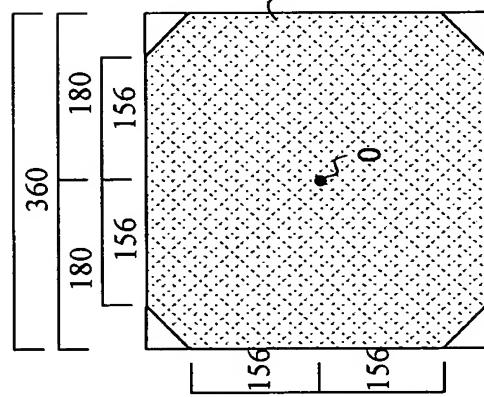
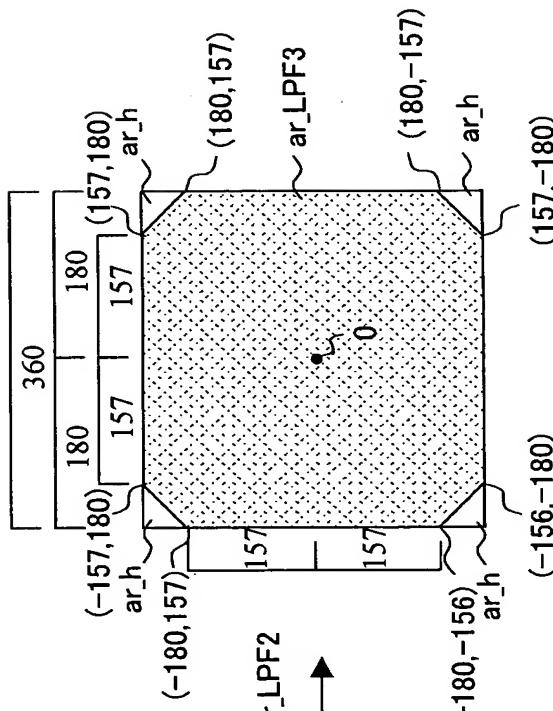


FIG. 18B



10/518607

FIG. 18C

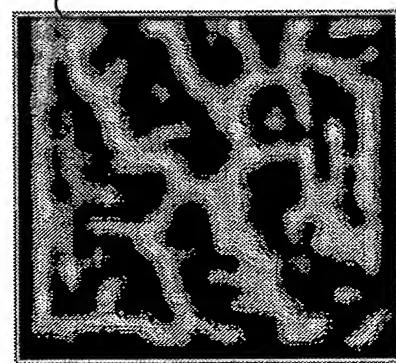


FIG. 18D

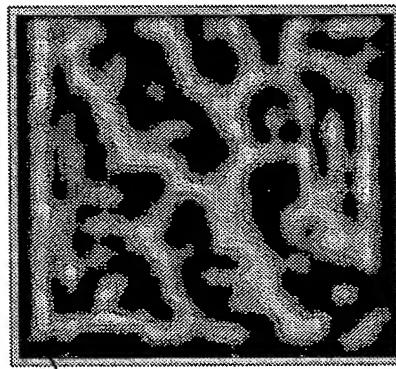


FIG. 18E

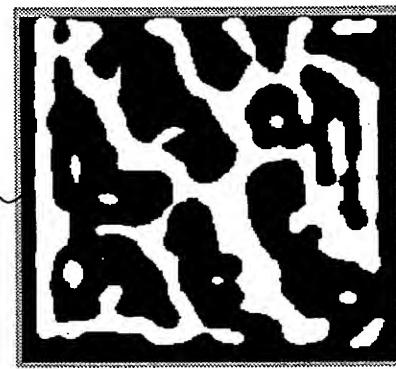


FIG. 19C

S18103



FIG. 19B

S18102

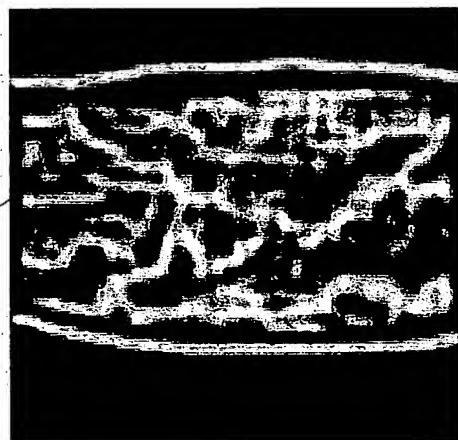
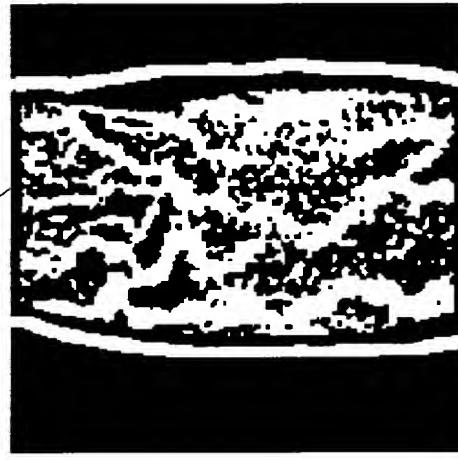
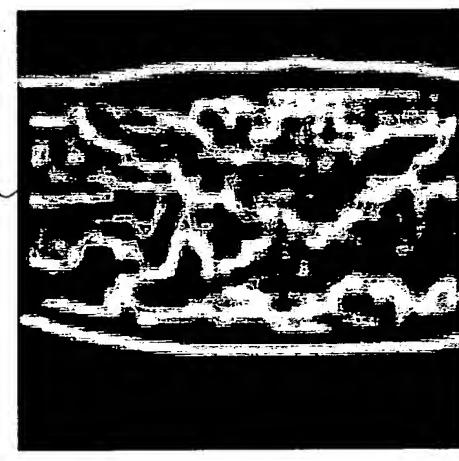


FIG. 19A

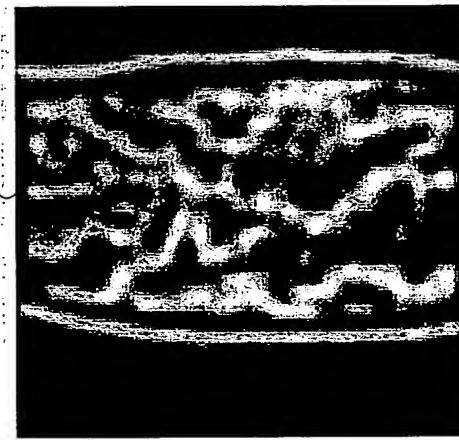
S1810



S18102



S18104



S18105

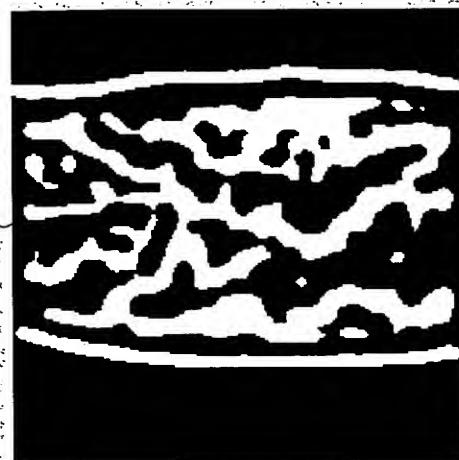
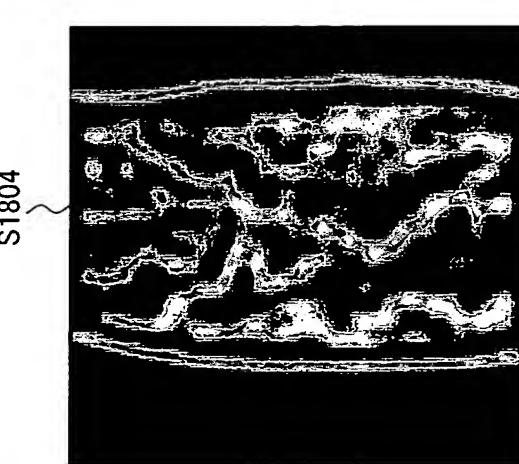


FIG. 19D

FIG. 19E

FIG. 19F

FIG. 20A



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BEST AVAILABLE COPY

FIG. 20B

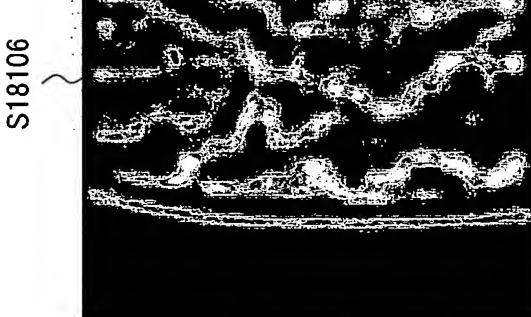


FIG. 20C

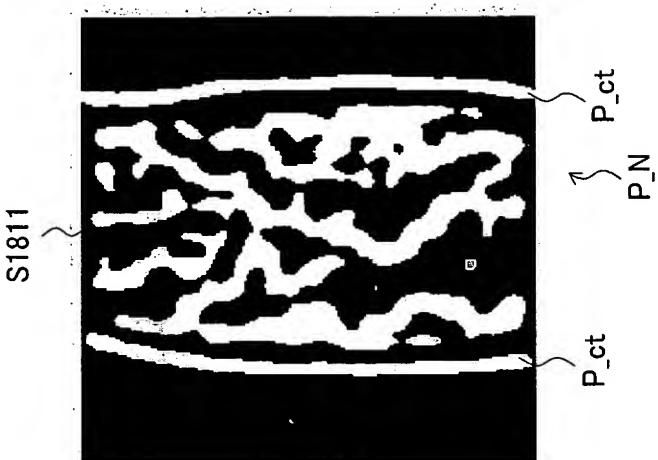


FIG. 21

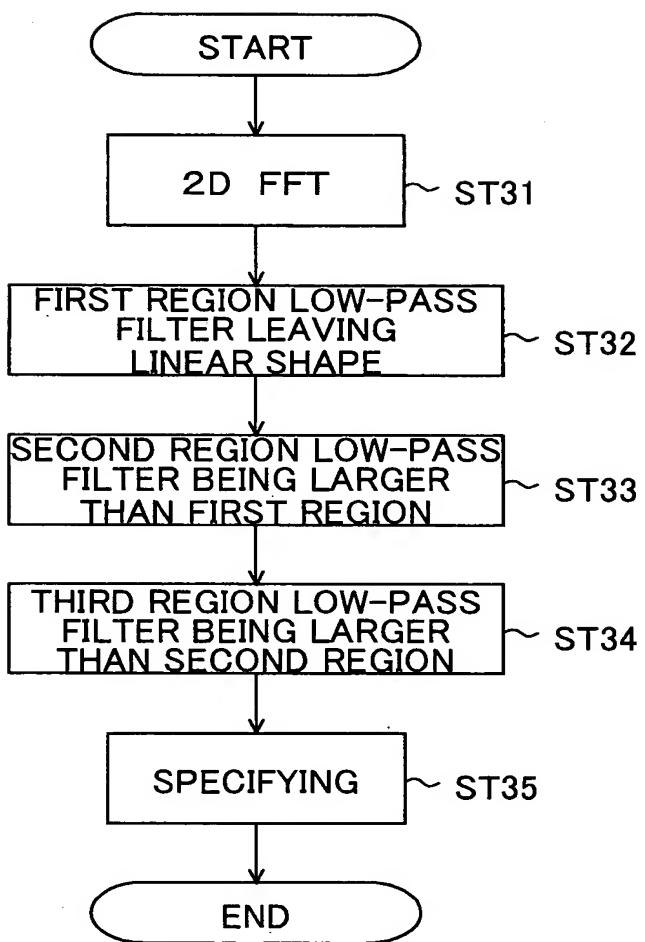


FIG. 22A

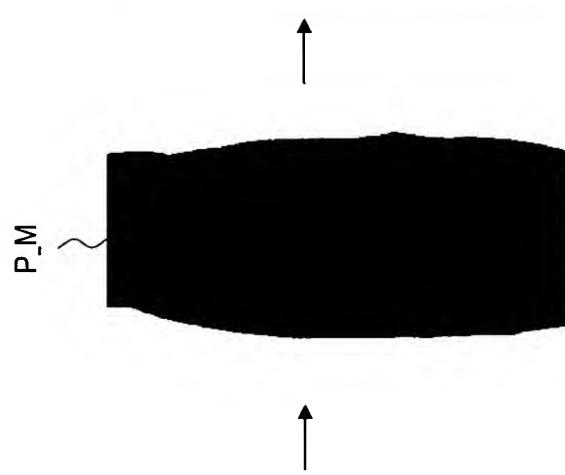


FIG. 22B

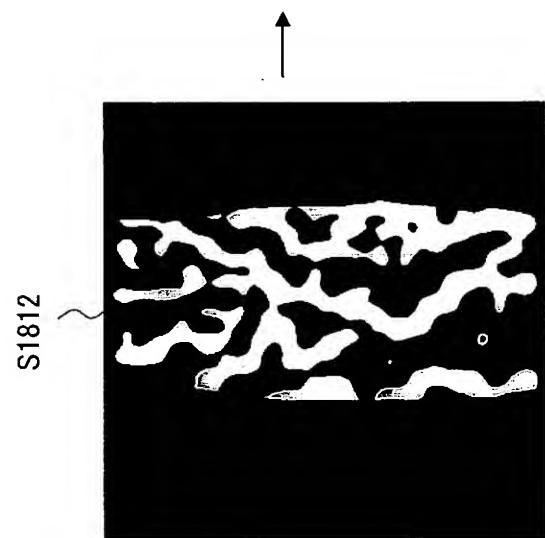


FIG. 22C

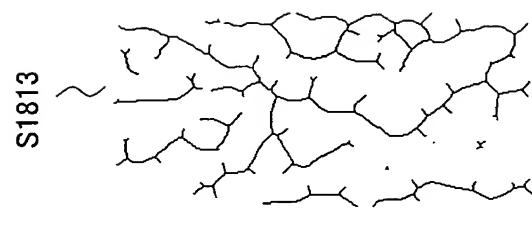


FIG. 23

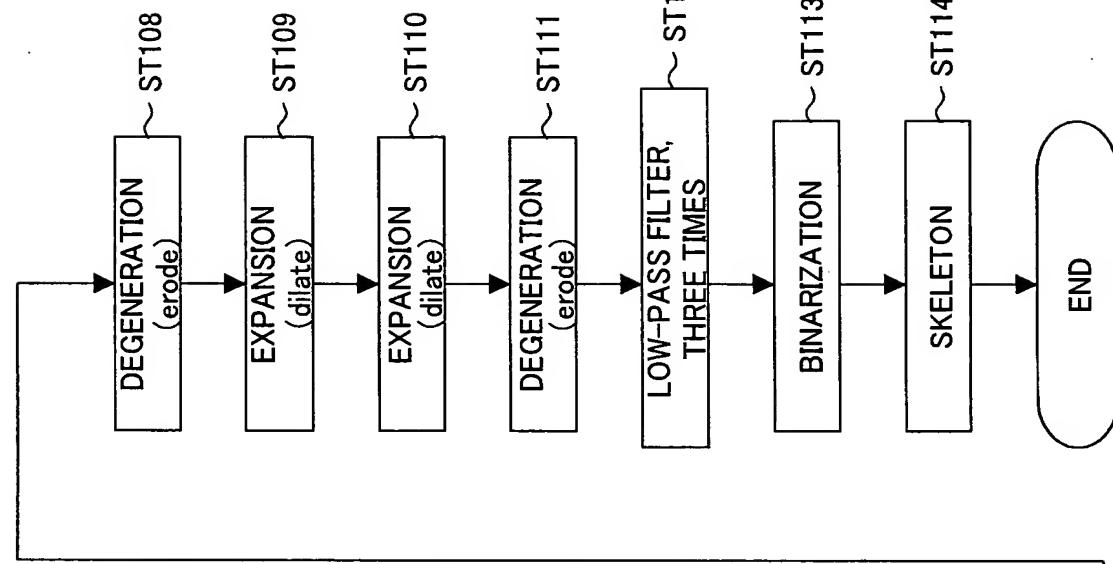
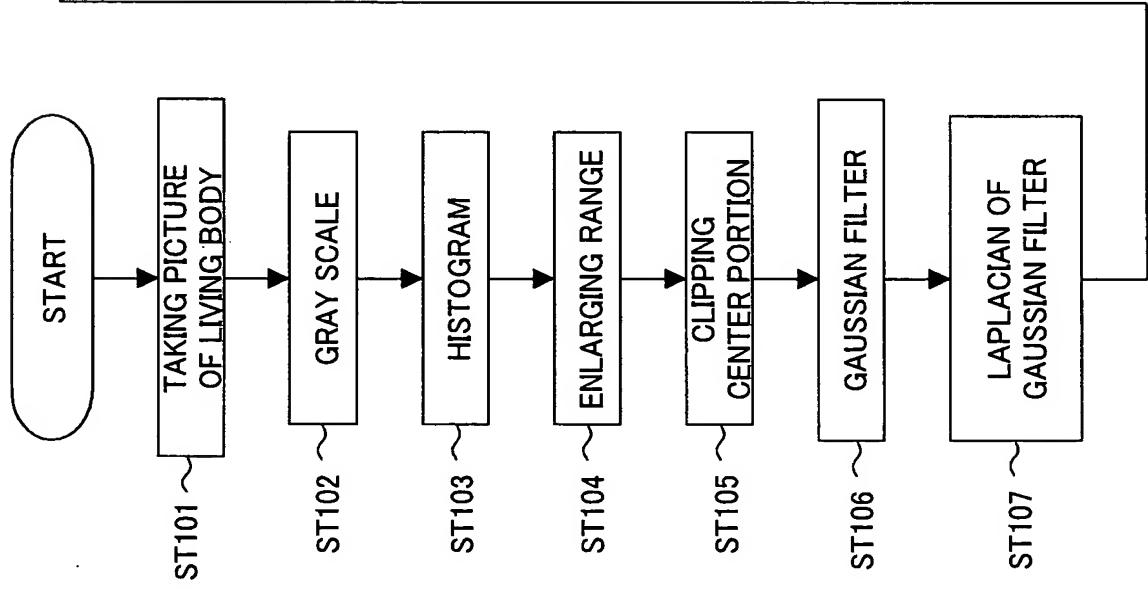


FIG. 24

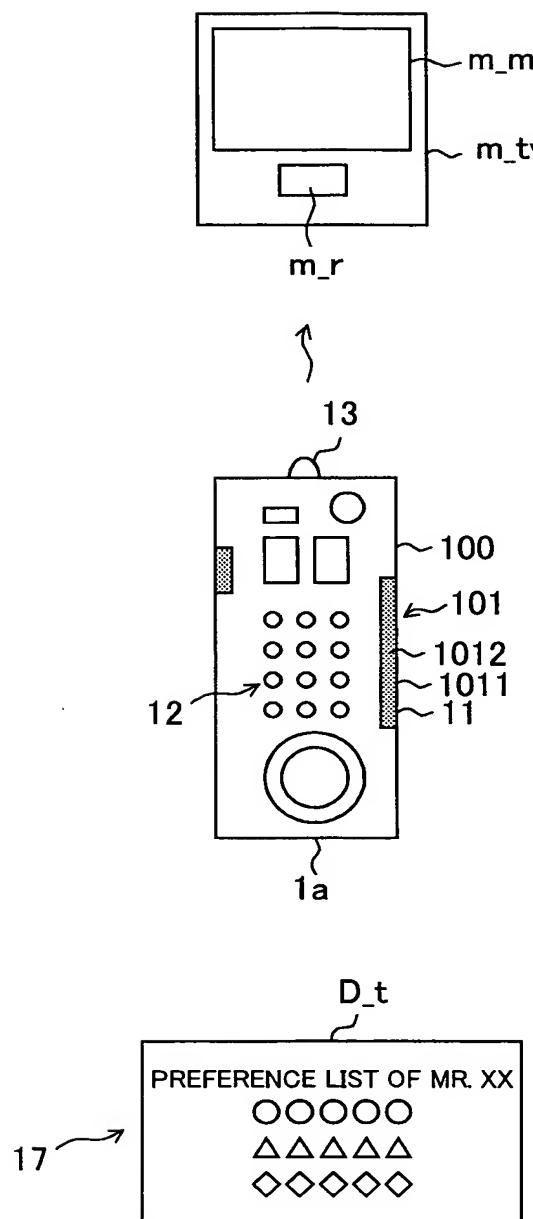


FIG. 25

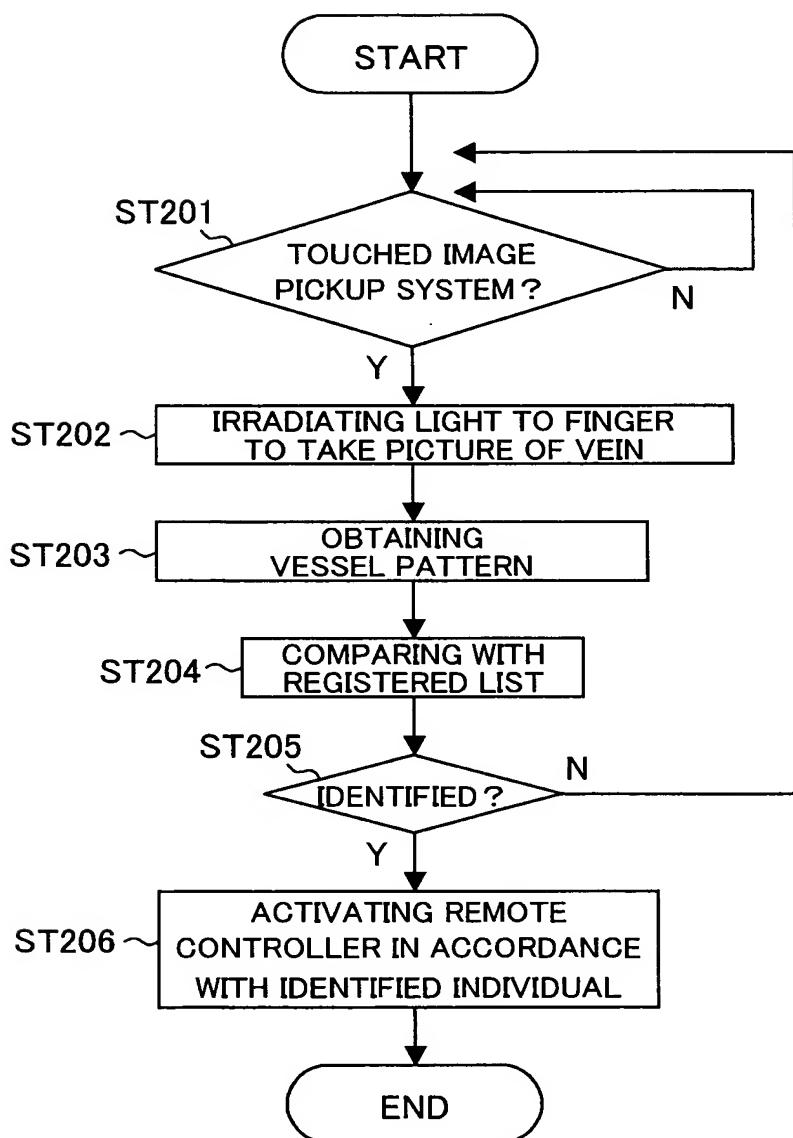
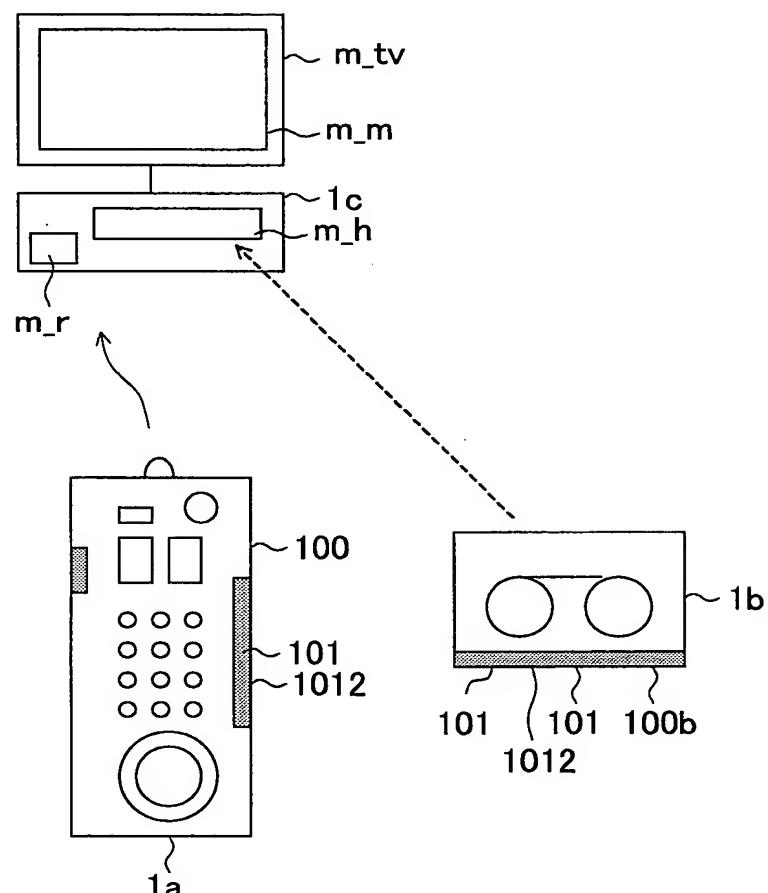


FIG. 26



10b

FIG. 27

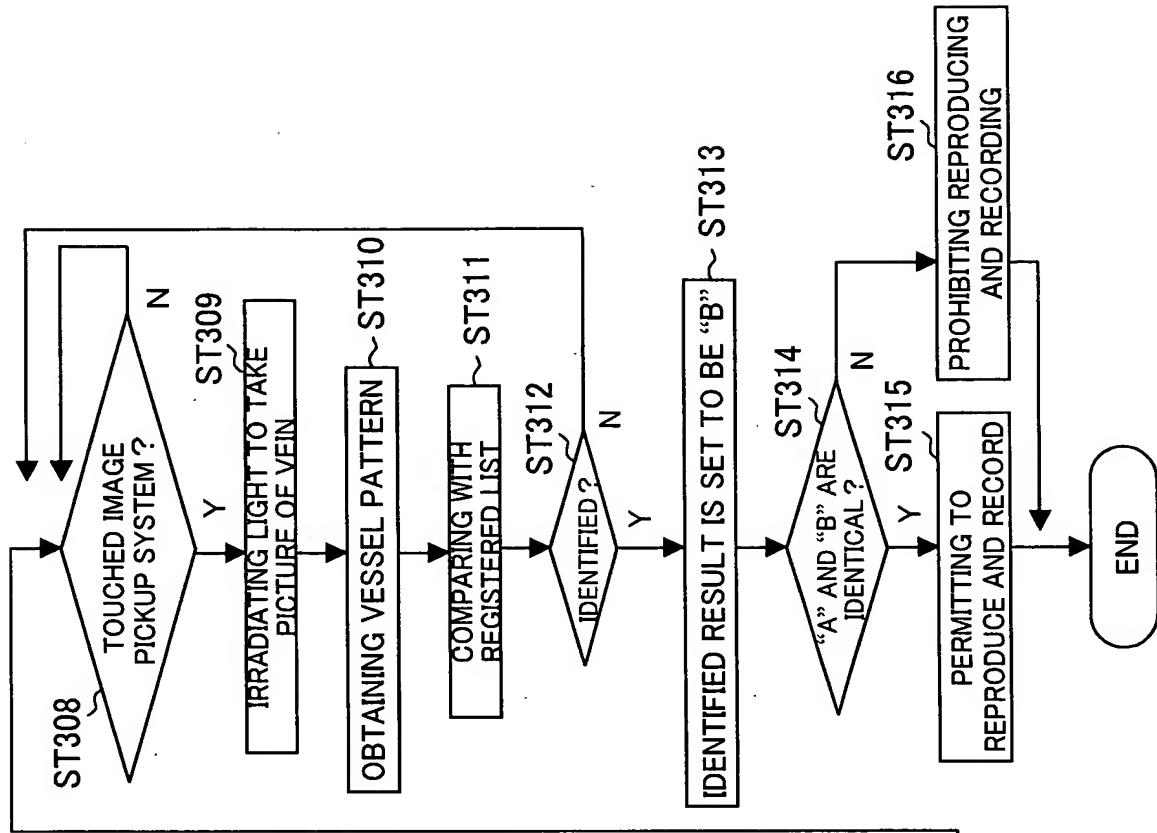
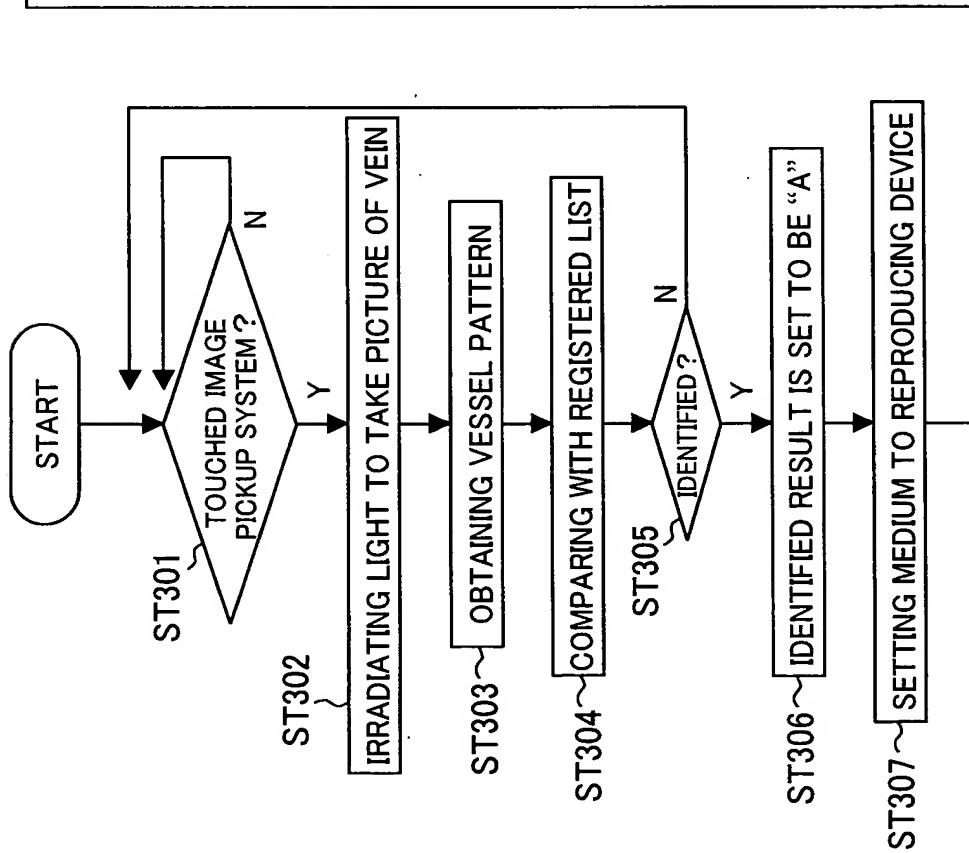


FIG. 28

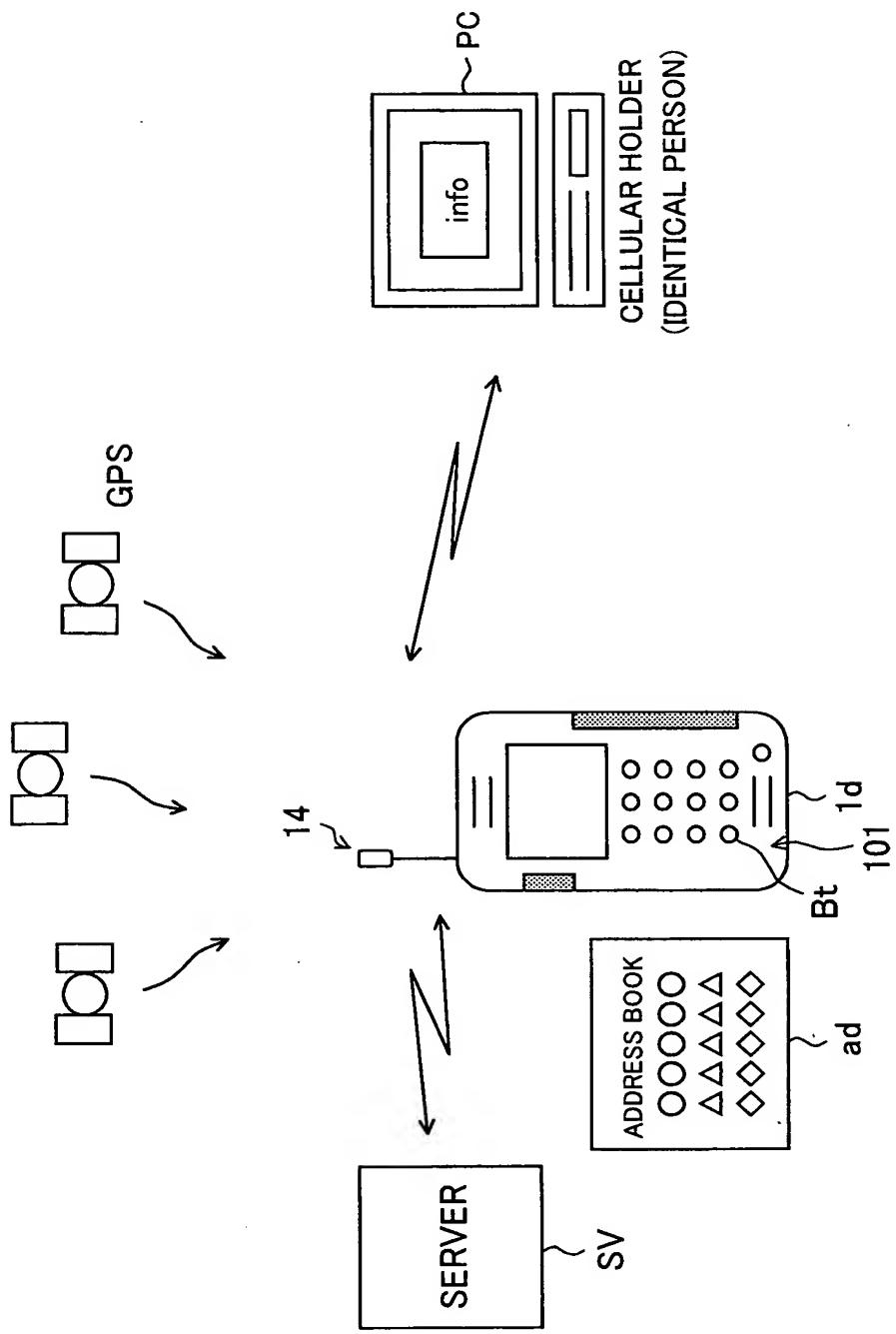


FIG. 29

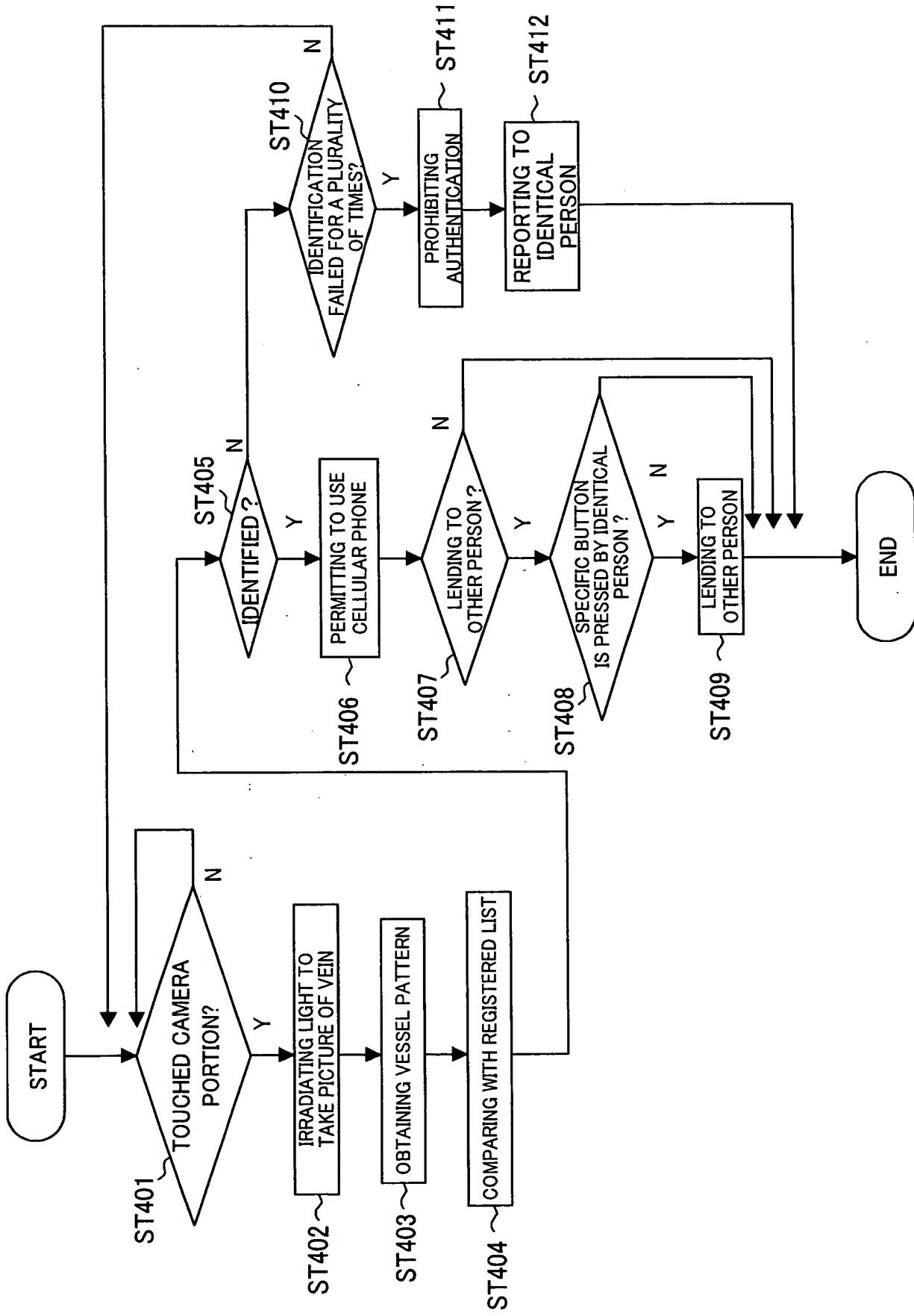


FIG. 30

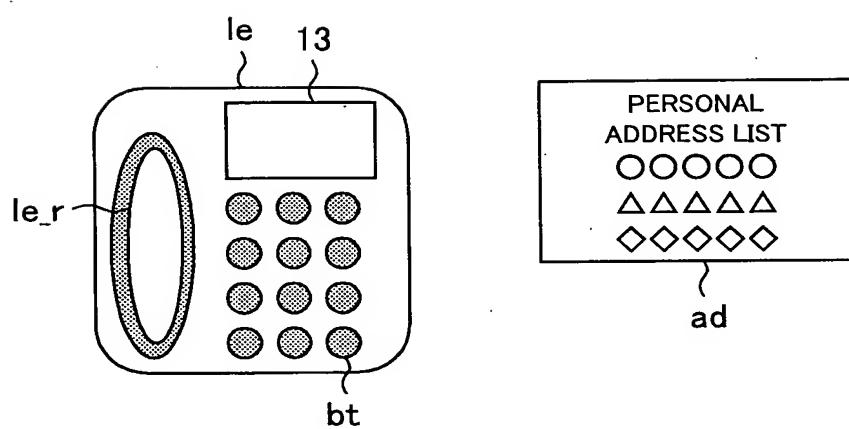


FIG. 31

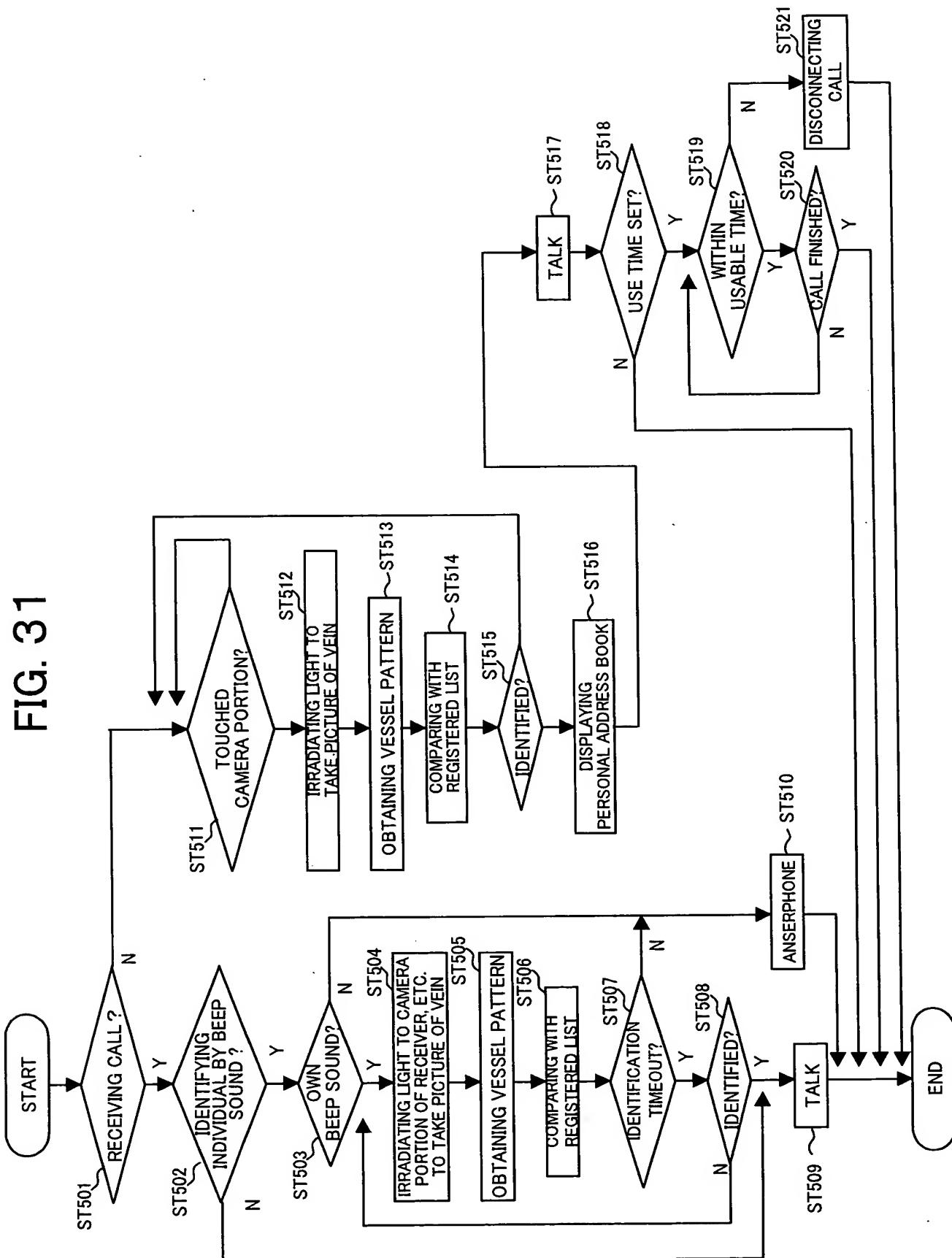


FIG. 32

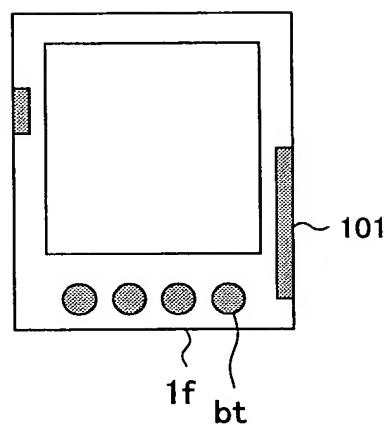
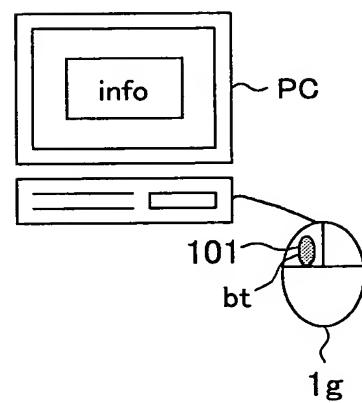


FIG. 33



Explanation of References

- 1... data processing apparatus
- 2... image pickup unit
- 5 12... input unit
- 13... output unit
- 14... communication interface
- 15... RAM (random access memory)
- 16... ROM (read only memory)
- 10 17... memory unit
- 18... CPU
- 101... image pickup system
- 102... extracting unit
- 103... authentication unit
- 15 1011... irradiation portion
- 1012... optical lens
- 1801... gray scale conversion portion
- 1802... distribution data generation portion
- 1803... specifying portion
- 20 1804... mapping portion
- 1805... Gaussian filter
- 1806... Gaussian Laplacian
- 1807... first degeneration processing portion
- 1808... first expansion processing portion
- 25 1809... second expansion processing portion

1810... second degeneration processing portion

1811... low-pass filter portion

1812... mask portion

1813... skeleton portion

5 1814... selection portion

1815... noise removing filter

1815_1... Gaussian filter

1815_2... median filter

1815_3... maximum value filter

10 1815_4... minimum value filter

1815_5... two-dimensional adaptive noise removing filter

1815_6... proximity filter

1815_7... averaging filter

1815_8... Gaussian low-pass filter

15 1815_9... two-dimensional Laplacian proximity filter

1815_10... Ga